

## HUMAN RESOURCES FOR TREATING NEW CANCER CASES IN SERBIA

### Executive Summary

The purpose of this report is to describe the human resources needed in Serbia to treat new cancer patients.

The population of Serbia is approximately 9.84 million (4.87million men and 4.97 million women) and the estimated number of new cancer cases in Serbia for the year 2008, based on Globocan data for Serbia as a whole (<http://globocan.iarc.fr/>) was 34183 (17720 in men and 16463 in women) (Table A). The five most common cancers in Serbia are (1) lung, (2) colorectal, (3) breast, (4) urological (bladder, kidney, prostate and testis) and (5) gynecological (cervix uteri, corpus uteri and ovary).

Table A: The ten most frequently occurring cancers in Serbia for men and women based on 2008 Globocan data (<http://globocan.iarc.fr/>).

Cancer	Both	Rank	Men	Rank	Women	Rank
All cancers excl. non-melanoma skin cancer	34183		17720		16463	
Lung	6337	1	4812	1	1525	4
Colorectal	4555	2	2573	3	1982	3
Breast	4384	3			4384	1
Urological	4092	4	3401	2	691	6
Gynecological	3054	5			3054	2
Hematological	2096	6	1163	5	933	5
Head & neck	2018	7	1510	4	508	8
Stomach	1434	8	911	6	523	7
Pancreas	1038	9	572	7	466	10
Brain, nervous system	1003	10	522	8	481	9
Melanoma of skin	684	11	376	10	308	11
Liver	625	12	392	9	233	12

Newly diagnosed cancer patients need pathology, surgery, chemotherapy and/or radiation therapy. The number of oncologists needed is based, therefore, on the number of patients requiring pathology, surgery, chemotherapy and radiation therapy (Table B). This number is estimated from the percentage of patients

requiring surgery, chemotherapy and/or radiation therapy for the top ten cancers in both men and women. For developing countries the International Atomic Energy Agency (IAEA) recommends training radiation/clinical oncologists who can prescribe both radiation and chemotherapy for the common solid cancers, instead of separate medical and radiation oncologists. Hematological malignancies are treated primarily by hematologist-oncologists. The number of specialists needed is based upon the number of cancer patients but each city, in order to ensure coverage if one person leaves or goes on vacation, must have at least 2 surgical oncologists, 2 radiation/clinical oncologists, 2 hematologist oncologists, etc.

Table B: Number of oncologists needed for Serbia's two most populous cities based on 2011 population estimates (<http://citypopulation.de/>) and 2008 Globocan data for new cancer cases (<http://globocan.iarc.fr/>).

	New Cancer Cases	Hematologist Oncologists	Surgical Oncologists	Radiation / Clinical Oncologists	Urologic Oncologists	Gynecologic Oncologist	Neuro-Oncologists	Pathologists
Beograd	3946	2†	5	20	2	2†	2†	8
Novi Sad	771	2†	2†	4	2†	2†	2†	2

†At least 2 are needed in each city.

In addition to oncologists, support staff such as onco-pharmacists, pharmacy technicians, oncology nurses and palliative care specialists is also needed. Many cancer patients require hospitalization for diagnosis, treatment and/or complications, therefore an adequate number of oncology beds will be needed. The number of oncology nurses, onco-pharmacists and pharmacy technicians needed is based upon the number of beds occupied daily by cancer patients while the number of palliative care specialists is based on the number of new cancer cases per year (Table C). The oncology nursing staff for each 24-bed oncology unit (operating 24 hours a day, 7 days a week) comprises of one head nurse and a nurse specialist as well as 13 nurses working 8 hour shifts, 5 days per week.

Table C: Number of oncology Units, oncology nursing and pharmacy staff needed for Serbia's two most populous cities based on 2011 population estimates (<http://citypopulation.de/>) and 2008 Globocan data for new cancer cases (<http://globocan.iarc.fr/>).

	New Cancer Cases	Oncology Beds/Day	24 bed Oncology Wards	Onco-Pharmacists	Pharmacy Technicians	Palliative Care Specialists	Oncology Ward Nurses
Beograd	3946	76	4	16	24	8	60
Novi Sad	771	15	1	4	6	2	15

†At least 2 are needed in each city.

Since many cancer patients require radiotherapy, appropriately equipped facilities will be needed along with radiation oncology staff (Tables D and E). Radiation oncology staff includes radiation therapy technicians, medical physicists, Linac engineers and radiation oncology nurses in addition to

radiation/clinical oncologists. The minimum radiation therapy equipment requirements are at least one of each: Linac, brachytherapy unit, CT simulator, treatment planning computer and dosimetry/quality assurance package.

Table D: Radiation Therapy Staff needed for Serbia's two most populous cities based on 2011 population estimates (<http://citypopulation.de/>) and 2008 Globocan data for new cancer cases (<http://globocan.iarc.fr/>).

	New Cancer Cases	Radiation / Clinical Oncologists	Radiation Therapy Technicians	Medical Physicists	Linac Engineers	Radiation Oncology Nurses
<b>Beograd</b>	<b>3946</b>	20	29	10	3	10
<b>Novi Sad</b>	<b>771</b>	4	6	2	2 <sup>†</sup>	2

<sup>†</sup>At least 2 are needed in each city.

Table E: Radiation Therapy Equipment needed for Serbia's two most populous cities based on 2011 population estimates (<http://citypopulation.de/>) and 2008 Globocan data for new cancer cases (<http://globocan.iarc.fr/>).

	New Cancer Cases	Linac / Co 60 Megavolt Unit	Brachytherapy Units	CT Simulators	Treatment Planning Computers	Dosimetry /QA Packages
<b>Beograd</b>	<b>3946</b>	5	3	3	3	3
<b>Novi Sad</b>	<b>771</b>	1	1	1	1	1

**NOTE:** Guidelines from the IAEA of the United Nations were used to calculate the radiation therapy equipment and staff needed in the setting of a developing Serbia. Guidelines from the Oncology Nursing Society were used to calculate the number of nurses needed. Several other specialty societies were also requested to provide guidelines but in most cases there were none, therefore colleagues active in those fields were consulted for estimating the number of staff needed.